REMARKS

The claims as amended and the new claims above to not represent new matter. The utilization of the phrase "from above" is obvious from U.S. Patent 6,187,988, whose specification and drawings are incorporated by reference; page 6, lines 1-3. In this reference all microwave radiating waveguides are shown peripheral or above a carbonaceous bed and none are employed below the carbonaceous material. Further waveguide design is not critical to the subject invention allowing radiating from above; page 5, lines 10-11. Additionally the amended 300 °F limit for discharge gases occurs on page 1, lines 18-20. Further the new claims 7-9 essentially represent only a condensed version of the as amended original claims 1-5; additionally, the phrase "microwave catalysis' is explained on page 3, lines 17-21.

The Examiner rejects claims 1-5 under 35 U.S.C. 103(a) as being unpatentable over Wicks et al., U.S. Patent 5,968,400, hereafter just Wicks.

The rejection is traversed by the foregoing amendments and the following discussion.

Wicks discloses a batch process for the combustion of waste materials using microwaves produced from microwave ovens completely surrounding two enclosed combustion containers; Figures 1 and 2, column 3, lines 55-66, claim 3. Conversely, the subject invention is a potentially continuous process whereby the purge gas passes over the waste material as microwave pyrolysis is occurring and is channeled directly through an oxidation catalyst bed performing microwave catalysis; page 7, lines 17-31, page 8, lines 1-2. Further the subject invention performs the selected organic chemistry process of pyrolysis and not the general chemistry process of combustion; page 7, lines 17-25, claim 1 as amended, new claim 7. Pyrolysis is defined as breaking up by heat an organic molecule and is not the same as combustion, since pyrolyzing organic molecules breaks them apart into smaller pieces. When pyrolysis produces gases, they are removed by the purge gas, and in addition pyrolysis does not require the high temperatures associated with combustion; A. Streitwieser and C. Heathcock, *Introduction to Organic Chemistry*, p76, Macmillan, NY, 1976. Since the subject invention performs microwave destruction of harmful contaminated wastes, such as chemical agents, biological agents, and medical waste, pyrolysis itself is often sufficient to break down these organic molecules into a non-harmful category; claim 1 as amended, claim 2 as amended, new claim 7, new claim 8.

Wicks' statement that his process uses microwaves to physically transform a waste material is targeted toward combustion; column 1, 42-45. Conversely, the subject invention targets the organic chemical process pyrolysis, not the physical process of combustion, based upon information common to a person having ordinary skill in the art, and is particularly appropriate for high

efficiency at low temperatures when combined with microwave catalysis; page 3, lines 17-21, page 7, lines 17-31, page 8, lines 1-2.

Wicks' first combustion container initially accepts the waste material in a crucible and is covered by box-like enclosure containing an unknown amount of SiC that then generates heating by thermal radiation; column 3, lines 50-58. Conversely, the subject invention compacts the waste material on a platform, not in a crucible closed container, that contains substantial SiC, and then directs the microwave energy down upon the platform to pass through the waste material causing an initial pyrolysis when the initiation temperature is obtained by the surface of the SiC impregnated platform, and then in a reverse stage process creating a further energy transfer mechanism for reverse pyrolysis to occur for the waste material; page 6, example 5, page 7, lines 17-31, page 8, lines 1-2, claim 1 as amended, new claim 7. The process of "reverse pyrolysis," as employed but not so named in the subject invention, means that the SiC platform is locally heated by microwaves to the pyrolysis initiation temperature, usually between 450 and 500 °C, so that after pyrolysis starts it will continue alone; thus, the microwave energy can be turned off, and the pyrolysis will continue up, rather than down, through the thickness of the compacted waste material; see B. Dean Allied, Editor, *Oil Shale Processing Technology*, Chapter 3, Center for Professional Advancement, East Brunswick, NJ, 1982.

Wicks' second combustion chamber handling the purge off-gas contains additional SiC, but no catalyst, and operates at 1000-1200 °C; column 3, 62-67, column 4, lines 1-8, 20-31. Conversely, the subject invention utilizes an oxidation catalyst energized by microwave catalysis with selected SiC usage that further converts the pyrolysis vapors contained by the purge gas into gases that are readily available for discharge, and further does not exceed a bulk discharge temperature of 300 °F, far below Wicks' combustion temperatures of 1000-1200 °C; page 7, lines 17-31, page 8, lines 1-2, claim 1 as amended, new claim 7.

Wicks resulting process reduces organic off-gas concentrations but only to an order of magnitude; column 5, lines 1-5, Tables 1-3. Conversely, the subject invention produces a discharge gas that is essentially free from hydrocarbons, including organic gases, as the Total Carbon Analyzer readings remained at zero for the entire process period; page 6, example 1, example 5.

There is a further major aspect to the subject invention being nonobvious. The case *Rutz v. A.B. Chance Co.*, 57 U.S.P.Q.2d 1161 (Fed.Cir. 2000) reiterated the common Graham findings giving the four factual inquiries in order to find obviousness: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed

invention and the prior art; and (4) secondary considerations of nonobviousness. The above discussion concentrates on factual inquiry (3).

Factual inquiry (2), the level of ordinary skill in the art, is also important. Wicks never mentioned or discussed the concept of "microwave catalysis" in his indicated patent. Conversely Cha, the inventor of the subject invention, has utilized this unique concept for at least a decade and in many patents. For instance see, Cha, U.S. Patent 5,246,554, 09/21/93, and his many subsequent patents involving this concept of microwave catalysis; page 3, lines 17-21. Therefore, Cha's concept of utilizing microwave catalysis has been available for many years and can be considered a part of the ordinary skill in the art of microwave usage. Wicks nonuse and complete silence of this proves his non-belief in the process of microwave catalysis as a potential obvious substitute for the Wicks' invention, and further can be considered as teaching away from the subject invention.

Additionally another interpretation is based upon inquiry (1), the scope and content of the prior art. Wicks apparently did not believe microwave catalysis was a part of the scope and content of the art of microwave usage, and thus to Wicks the subject invention represents a higher, nonobvious level of skill in the art of microwaves.

In conclusion the many important non-verifications on the Graham requirements between Wicks and the subject invention as described above indicate that a person having ordinary skill in the art to which the subject matter pertains would not have deemed the subject invention obvious in relationship to the Wicks' disclosure.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. This is Wicks et al, U.S. Patent No. 6,262,405 B1, hereafter Wicks '405.

Wicks '405 is a continuation in part of the above Wicks' patent and although it has a different title using the phrase "medical waste," the abstracts are identical with no mention of medical waste, and further nearly all the specification is the same. Therefore Wicks '405 does not contain any new information beyond that of Wicks, and consequently the subject invention is still nonobvious based upon the above discussion of Wicks.

In view of the above, each of the active claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Respectfully submitted,

Dated: 3/25/04

John Q. Mingle
Attorney for Applicant
Reg. No. 31458
P.O. Box 1311
Laramie, WY 82073
307-742-0171